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Upogebia miocenica n. sp. (Crustacea, Thalassinidea, Upogebiidae) from the Miocene of Catalonia (Spain)

Abstract – *Upogebia miocenica* n. sp. (Upogebiidae Borradaile, 1903) is described from the Miocene around Vilafranca del Penedès (Barcelona). The discovery of *U. miocenica* n. sp. enhances the knowledge of the genus because not only it is the most complete species known then in Europe, but it enlarges the palaeogeographic distribution of the genus, known to date only in Hungary and Italy.

Key words: Crustacea, Thalassinidea, Miocene, Spain.

Resumen – *Upogebia miocenica* n. sp. (Crustacea, Thalassinidea, Upogebiidae) del Mioceno de Cataluña (España).

Se describe un nuevo taxón de crustáceo talassínido del Mioceno, recuperado de la población de Vilafranca del Penedès (Barcelona). Los especímenes estudiados se asignan a la infraorden Thalassinidea Latreille, 1831 con el registro de *Upogebia miocenica* n. sp. (Upogebiidae Borradaile, 1903). El hallazgo de *U. miocenica* n. sp. es destacable no tan sólo por ser la especie más completa conservada en Europa, sino porque amplía la distribución paleogeográfica del género, conocido hasta el momento en Hungría e Italia.

Palabras clave: Crustacea, Thalassinidea, Mioceno, España.

Riassunto – *Upogebia miocenica* n. sp. (Crustacea, Thalassinidea, Upogebiidae) del Miocene della Catalonia (Spagna).

Upogebia miocenica n. sp. (Upogebiidae Borradaile, 1903) è descritta nel Miocene dei dintorni di Vilafranca del Penedès (Barcellona). La scoperta di *U. miocenica* n. sp. incrementa le conoscenze del genere non solo perché si tratta della specie più completa finora conosciuta in Europa, ma anche perché allarga la distribuzione paleogeografica del genere, conosciuto finora solo in Ungheria e Italia.

Parole chiave: Crustacea, Thalassinidea, Miocene, Spagna.

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Introduction and geological setting

Recent works for a construction in the district named Les Clotes, of the Vilafranca del Penedès City (Province of Barcelona, Catalonia) (Fig. 1), allowed to rescue abundant and extraordinarily complete thalassinoids assigned here to the genus *Upogebia* Leach, 1814. The subsoil of the city of Vilafranca del Penedès is geologically situated within the Vallès-Penedès basin, mainly filled by non-marine alluvial sequences interrupted by at least three episodes of marine transgressions (Cabrera *et al.*, 1991; Cabrera & Calvet, 1996). The sediments containing crustaceans at this locality correspond to the Langhian transgression (Middle Miocene), which is supposed to be the most extensive, and is characterized locally by yellow and gray clays widely distributed along the Basin (Batllori & García, 1997; Sanz, 2001; Gibert & Robles, 2005). The local associated fauna consists of small and not abundant bivalves and gastropods scarcely distributed within gray clays, in contrast to the macrurans that are very abundant considering the reduced surface of collection. The Vallès-Penedès basin extends in a southwest-northeast direction, nearly parallel to the present coast, and during the Langhian transgression the subsoil of Vilafranca del Penedès was approximately situated in the central area, so that the local deposits correspond to a fairly marine facies. Some previous records have been established for crustaceans within the area and similar age, supposed to be characteristic of concrete environmental conditions as reefal or nearshore habitats (Müller, 1993; Artal, 2007); the new taxon, according to the lithology, associated fauna, and location within the basin appears to be characteristic of open but shallow marine environmental conditions.

Previous reports of Miocene upogebids from Spain

The specimens of upogebids from the Miocene of Spain are rare and limited today only to one report. Müller (1993) reported some complete but poorly preserved, piritized specimens from Vilafranca (Barcelona), ascribing them to *Upogebia* sp., pointing out that even though the specimens are entirely preserved, fine details were obscured not permitting a closer determination.

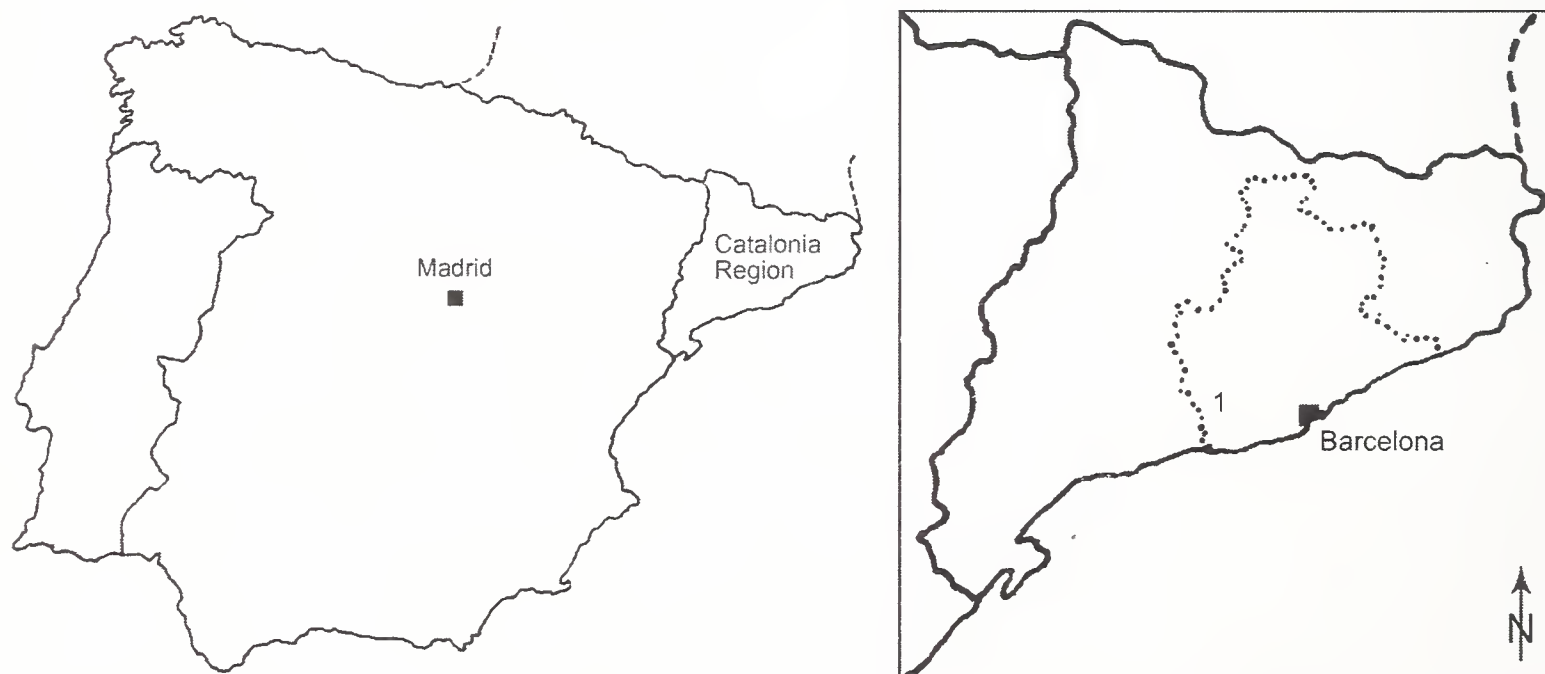


Fig. 1 – Geographic map with the fossiliferous locality / cartina geografica con la località fossilifera. 1) Vilafranca del Penedès.

However the review of these specimens and the new collected material subject of this study, allowed to identify many morphological characters useful for their correct determination and reconstruction of the belonging species.

Material

The studied sample includes eleven fragmentary and articulate specimens, housed in the Museu Geològic del Seminari Conciliar of Barcelona (MGSB). The specimens are flatted on the bedding planes. Their preparation was easy as a result of the softness of the surrounding clay. The studied specimens are ascribed to *Upogebia miocenica* n. sp.

The systematic arrangement used in this paper follows the recent classification proposed by Tsang *et al.* (2008).

Abbreviations

P1-P5, first to fifth pereopods; a1-a6, abdominal segments; mpx3, third maxilliped.

Measurements are given in millimetres (mm).

Systematic Palaeontology

Infraorder Thalassinidea Latreille, 1831
Superfamily Thalassinoidea Latreille, 1831
Family Upogebiidae Borradaile, 1903
Genus *Upogebia* Leach, 1814

Type species: *Cancer (Astacus) stellatus* Montagu, 1808, by original designation.

Included fossil species: *U. barti* Fraaije, Van Bakel, Jagt & Coole, 2006; *U. boehmi* Glaessner, 1930; *U. dura* (Moericke, 1889); *U. eocenica* Rathbun, 1926; *U. gamma* (Rathbun, 1935); *U. lambrechtsi* Fraaije, Van Bakel, Jagt & Coole, 2006; *U. midwayensis* Rathbun, 1935; *U. mizunamiensis* Karasawa, 1989; *U. perarolensis* De Angeli & Messina, 1992; *U. rhacheochir* (Stenzel, 1945); *U. scabra* Müller, 1974; *U. striata* Karasawa & Kishimoto, 1996; *U. tanegashimensis* Karasawa & Inoue, 1992.

Upogebia miocenica n. sp.
Figs. 2-8

Diagnosis: carapace elongate, wide; anterior dorsal margin serrate; rostrum short, spineless and curved downwards; cervical groove weak; P1 subchelate with dactylus having two rows of strong parallel tubercles running along dorsal margin; P2-5 achelate.

Etymology: the trivial name alludes to Miocene, geological period of the studied specimens.

Holotype: MGSB 74532 a-b (part and counter-part).

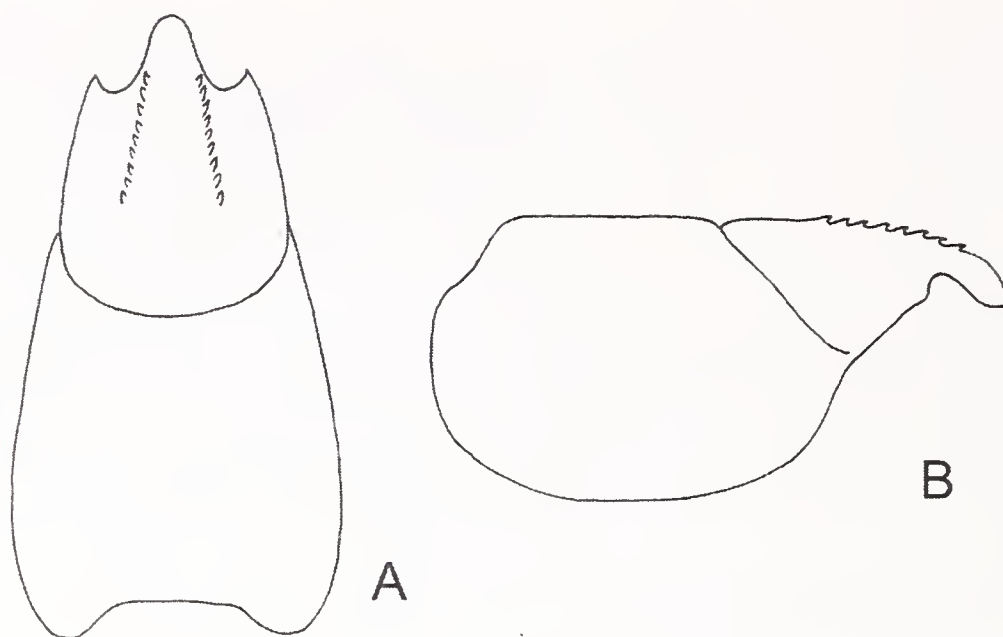


Fig. 2 – *Upogebia miocenica* n. sp. A) dorsal view of carapace / norma dorsale del carapace. B) lateral view of carapace / norma laterale del carapace.

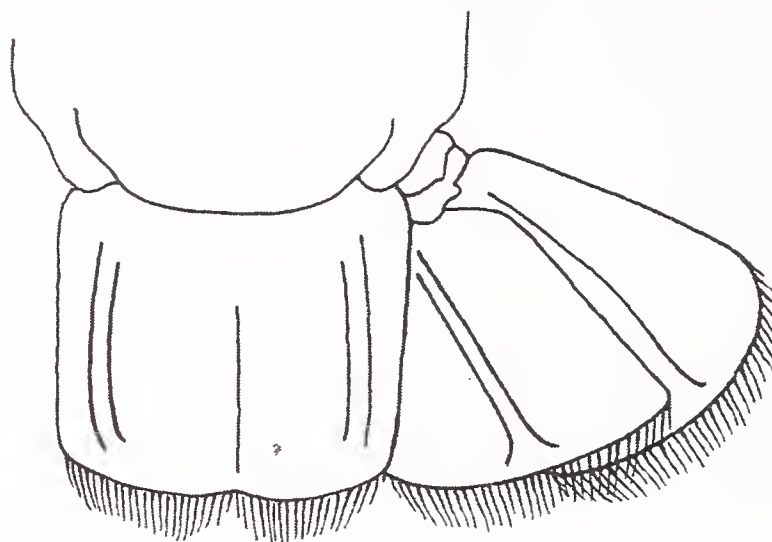


Fig. 3 – *Upogebia miocenica* n. sp., tail fan / ventaglio caudale.



Fig. 4 – *Upogebia miocenica* n. sp., incomplete reconstruction / ricostruzione incompleta.

Paratypes: MGSB 74533 a, 74534 b.

Type locality: Vilafranca del Penedès (Barcelona, Catalonia).

Geological age: Miocene.

Material: eleven fragmentary and articulate specimens in lateral and dorsal view, 40-50 mm long. MGSB 74532 a-b (part and counter-part), 74533 a, b, c, 74534 a-b (part and counter-part), c, 74535 a, b, c, d, e.



Fig. 5 – *Upogebia miocenica* n. sp., MGSB 74532, holotype / olotipo (x 2).



Fig. 6 – *Upogebia miocenica* n. sp., MGSB 74534 b, paratype / paratipo (x 2).

Description: medium-sized upogebid with exoskeleton finely tuberculate.

Carapace. Carapace elongate, wide. Anterior dorsal margin serrate. Rostrum short, spineless, strongly curved downwards. Cervical groove weak, complete. Gastric region narrow, smooth. Cardiac and branchial regions wide, smooth.

Abdomen. Segments a1, 3-5 equal in size. Segment a2 longer than the others. Segment a6 longer than a5. Telson subquadrate with lateral margins slightly converging backwards. Dorsal surface of telson with a weak median groove and a pair of strong ridges running parallel to lateral margins. Endopod of uropod reaching level of posterior margin of telson. Endopod of uropod with posterior margin slightly concave, straight outer margin, and strong median ridge. Exopod of uropod slightly overreaching endopod. Exopod of uropod with strong median ridge.

Cephalic appendages. Not well preserved. Only the specimen MGSB 74535d preserved long flagellum of antennae.

Thoracic appendages. mpx3 not preserved. P1 subchelate. Merus bearing two subterminal spines on dorsal margin, ventral margin spineless. Carpus bearing a median spine on dorsal margin, ventral margin spineless. Propodus bearing two proximal spines on

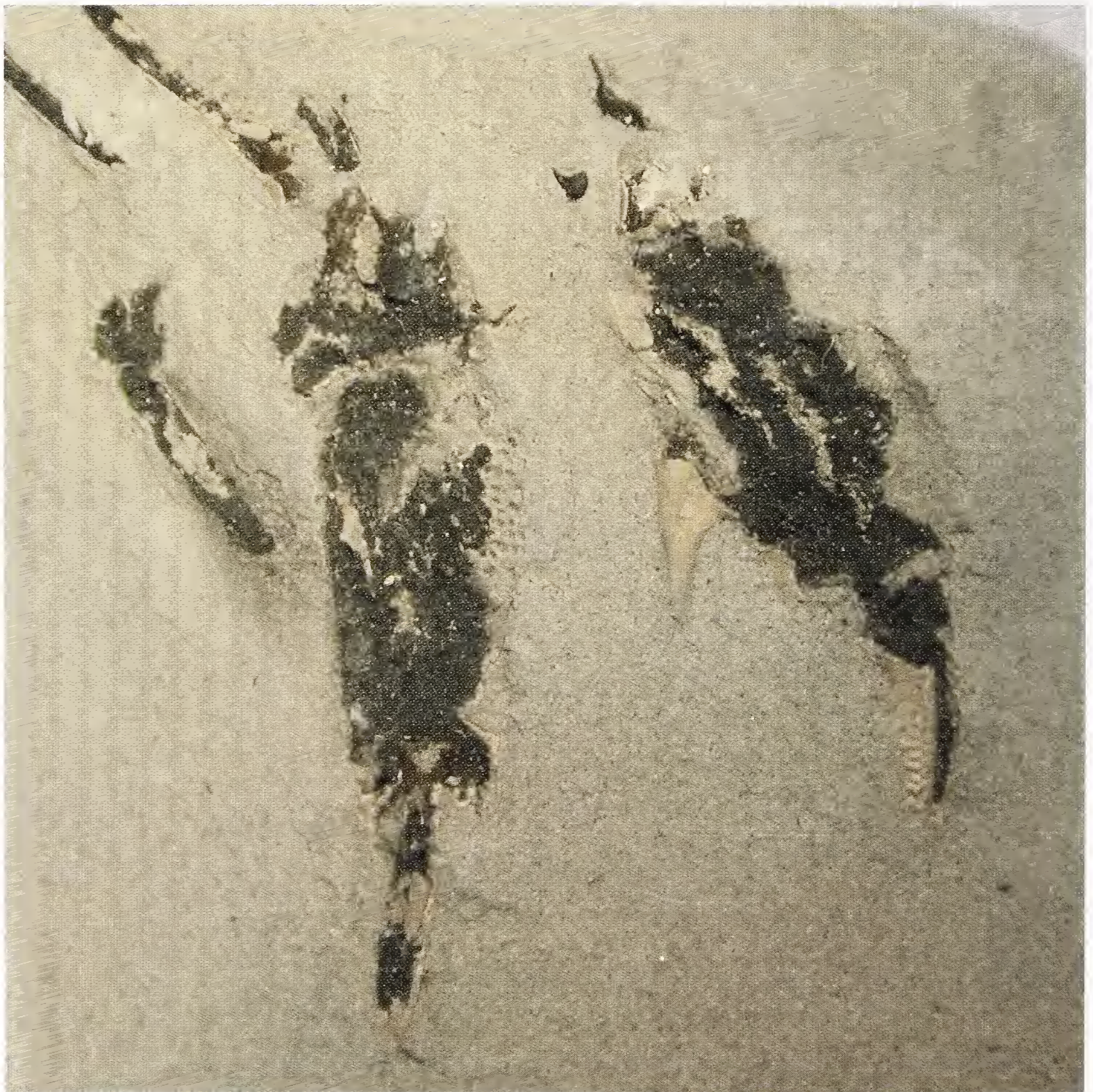


Fig. 7 – *Upogebia miocenica* n. sp., MGSB 74534b, detail of P1 / dettaglio di P1 (x 2).



Fig. 8 – *Upogebia miocenica* n. sp., MGSB 74535, detail of tail fan / dettaglio del ventaglio caudale (x 2).

dorsal margin, ventral margin with one strong, stout distal tooth. Dactylus strong, stout. Dorsal surface of dactylus having two rows of strong parallel tubercles running along dorsal margin. A series of small tubercles covering tip of dactylus. P2-5 achelate.

Abdominal appendages. Not preserved.

Discussion. As reported by Ngoc-Ho (2003), *Upogebia* is characterized by possession of cervical groove well defined, rostrum obtuse, bearing teeth or spines on lateral border, rarely unarmed, telson often with faint inverted U-shaped ridge dorsally, posterior border straight or slightly convex, unarmed, P1 equal, chelate or subchelate, P2-4 achelate, P5 subchelate, no suture on uropods. Most of these morphological characters are visible on the studied specimens that are ascribed to this genus.

At present, Upogebiidae has almost exclusively represented by Cenozoic species: *U. eocenica* Rathbun, 1926, *U. gamma* (Rathbun, 1935), and *U. midwayensis* Rathbun, 1935 (Eocene, United States), *U. barti* Fraaije, Van Bakel, Jagt & Coole, 2006 (Oligocene, United States), and *U. lambrechtsi* Fraaije, Van Bakel, Jagt & Coole, 2006 (Eocene, Belgium), *U. perarolensis* De Angeli & Messina, 1992 (Oligocene, Italy), *U. scabra* Müller, 1974 (Miocene, Hungary), *U. mizunamiensis* Karasawa, 1989, *U. striata* Karasawa & Kishimoto, 1996, and *U. tanegashimensis* Karasawa & Inoue, 1992 (Miocene, Japan).

Among the above-mentioned species, *U. scabra* is the only European species known to date from the middle Miocene (Badenian), represented by just one badly preserved carapace in dorsal view (Müller, 1974). Later Müller (1984) included this species among the synonymies of *Upogebia* sp. (div.?). Even though the comparison between the two Miocene species is difficult, *U. miocenica* n. sp. differs from the Hungarian species having a serrate anterior dorsal margin of the carapace and a short rostrum that is spineless strongly curved downwards.

Upogebia miocenica n. sp. is the most complete species of this genus known to date in Europe and its discovery enlarges the palaeogeographic distribution of *Upogebia*, known to date only in Hungary and Italy.

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